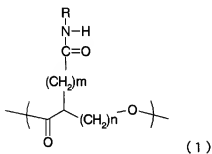


## B. Claims

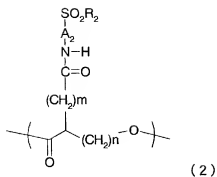
A complete listing of all the claims appears below; this listing replaces all earlier amendments and listings of the claims.

1. (Currently Amended) A polyhydroxyalkanoate comprising one or more units represented by chemical formula (1) in a molecule:

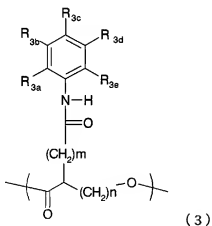


wherein R represents  $-A_1-SO_2R_1$ ,  $R_1$  represents OH, a halogen atom, ONa, OK, or  $OR_{1a}$ ,  $R_{1a}$  and  $A_1$  each independently represent a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure, n represents an integer selected from 1 to 4, m represents an integer selected from 0-1 to 8, and when ~~multiple units exist~~ the polyhydroxyalkanoate includes more than one unit of the chemical formula (1), R,  $R_1$ ,  $R_{1a}$ ,  $A_1$ , m, and n are independently selected for each unit.

2. (Currently Amended) A polyhydroxyalkanoate according to claim 1, comprising one or more units each represented by chemical formula (2), (3), (4A), or (4B) in a molecule as units of the chemical formula (1):

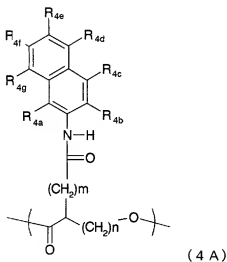


wherein  $R_2$  represents OH, a halogen atom, ONa, OK, or  $OR_{2a}$ ,  $R_{2a}$  represents a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group,  $A_2$  represents a linear or branched alkylene group having 1 to 8 carbon atoms,  $n$  represents an integer selected from 1 to 4,  $m$  represents an integer selected from 0-1 to 8, and when multiple units exist, the polyhydroxyalkanoate includes more than one unit of the chemical formula (2).  $A_2$ ,  $R_2$ ,  $R_{2a}$ ,  $m$ , and  $n$  are independently selected for each unit,



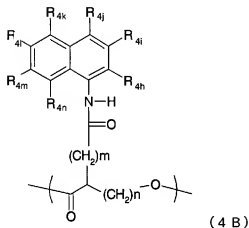
wherein  $R_{3a}$ ,  $R_{3b}$ ,  $R_{3c}$ ,  $R_{3d}$ , and  $R_{3e}$  each independently represent  $SO_2R_{3f}$  ( $R_{3f}$  represents OH, a halogen atom, ONa, OK, or  $OR_{3fi}$  ( $R_{3fi}$  represents a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group)), a hydrogen

atom, a halogen atom, an alkyl group having 1 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, an OH group, an NH<sub>2</sub> group, an NO<sub>2</sub> group, COOR<sub>3g</sub> (R<sub>3g</sub> represents an H atom, an Na atom, or a K atom), an acetamide group, an OPh group, an NHPh group, a CF<sub>3</sub> group, a C<sub>2</sub>F<sub>5</sub> group, or a C<sub>3</sub>F<sub>7</sub> group (Ph represents a phenyl group), and at least one of these groups represents SO<sub>2</sub>R<sub>3f</sub>, n represents an integer selected from 1 to 4, m represents an integer selected from 0-1 to 8, and when the polyhydroxyalkanoate includes more than one unit of the chemical formula (3) multiple units exist, R<sub>3a</sub>, R<sub>3b</sub>, R<sub>3c</sub>, R<sub>3d</sub>, R<sub>3e</sub>, R<sub>3f</sub>, R<sub>3f1</sub>, R<sub>3g</sub>, m, and n are independently selected for each unit,



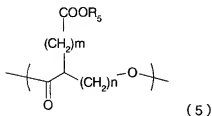
wherein R<sub>4a</sub>, R<sub>4b</sub>, R<sub>4c</sub>, R<sub>4d</sub>, R<sub>4e</sub>, R<sub>4f</sub>, and R<sub>4g</sub> each independently represent SO<sub>2</sub>R<sub>4o</sub> (R<sub>4o</sub> represents OH, a halogen atom, ONa, OK, or OR<sub>4o1</sub> (R<sub>4o1</sub> represents a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group)), a hydrogen atom, a halogen atom, an alkyl group having 1 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, an OH group, an NH<sub>2</sub> group, an NO<sub>2</sub> group, COOR<sub>4p</sub> (R<sub>4p</sub> represents an H atom, an Na atom, or a K atom), an acetamide group, an OPh group, an NHPh group, a CF<sub>3</sub> group, a C<sub>2</sub>F<sub>5</sub> group, or a C<sub>3</sub>F<sub>7</sub> group (Ph represents a phenyl group), and at least

one of these groups represents  $\text{SO}_2\text{R}_{4o}$ , n represents an integer selected from 1 to 4 and m represents an integer selected from 0-1 to 8, and when the polyhydroxyalkanoate includes more than one unit of the chemical formula (4A)~~multiple units exist~~,  $\text{R}_{4a}$ ,  $\text{R}_{4b}$ ,  $\text{R}_{4c}$ ,  $\text{R}_{4d}$ ,  $\text{R}_{4e}$ ,  $\text{R}_{4f}$ ,  $\text{R}_{4g}$ ,  $\text{R}_{4o}$ ,  $\text{R}_{4ol}$ ,  $\text{R}_{4p}$ , m, and n are independently selected for each unit,



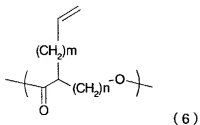
wherein  $\text{R}_{4h}$ ,  $\text{R}_{4i}$ ,  $\text{R}_{4j}$ ,  $\text{R}_{4k}$ ,  $\text{R}_{4l}$ ,  $\text{R}_{4m}$ , and  $\text{R}_{4n}$  each independently represent  $\text{SO}_2\text{R}_{4o}$  ( $\text{R}_{4o}$  represents OH, a halogen atom, ONa, OK, or  $\text{OR}_{4ol}$  ( $\text{R}_{4ol}$  represents a linear or branched alkyl group having 1 to 8 carbon atoms, or a substituted or unsubstituted phenyl group)), a hydrogen atom, a halogen atom, an alkyl group having 1 to 20 carbon atoms, an alkoxy group having 1 to 20 carbon atoms, an OH group, an  $\text{NH}_2$  group, an  $\text{NO}_2$  group,  $\text{COOR}_{4p}$  ( $\text{R}_{4p}$  represents an H atom, an Na atom, or a K atom), an acetamide group, an OPh group, an NHPH group, a  $\text{CF}_3$  group, a  $\text{C}_2\text{F}_5$  group, or a  $\text{C}_3\text{F}_7$  group (Ph represents a phenyl group), and at least one of these groups represents  $\text{SO}_2\text{R}_{4o}$ , n represents an integer selected from 1 to 4, m represents an integer selected from 0-1 to 8, and when the polyhydroxyalkanoate includes more than one unit of the chemical formula (4B)~~multiple units exist~~,  $\text{R}_{4h}$ ,  $\text{R}_{4i}$ ,  $\text{R}_{4j}$ ,  $\text{R}_{4k}$ ,  $\text{R}_{4l}$ ,  $\text{R}_{4m}$ ,  $\text{R}_{4n}$ ,  $\text{R}_{4o}$ ,  $\text{R}_{4ol}$ ,  $\text{R}_{4p}$ , m, and n are independently selected for each unit.

3. (Currently Amended) A polyhydroxyalkanoate comprising one or more units represented by chemical formula (5):



wherein  $R_5$  represents a hydrogen atom, a group for forming a salt, or  $R_{5a}$ ,  $R_{5a}$  represents a linear or branched alkyl or aralkyl group having 1 to 12 carbon atoms, or a group having a saccharide,  $n$  represents an integer selected from 1 to 4,  $m$  represents an integer selected from 0 to 8, when  $n = 4$ ,  $R_5$  represents only a group having a saccharide for  $m = 0$ , and when the polyhydroxyalkanoate includes more than one unit of the chemical formula (5) multiple units exist,  $R_5$ ,  $R_{5a}$ ,  $m$ , and  $n$  are independently selected for each unit.

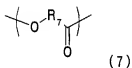
4. (Currently Amended) A polyhydroxyalkanoate comprising one or more units represented by chemical formula (6):



wherein  $n$  represents an integer selected from 1 to 4, when  $n$  represents an integer

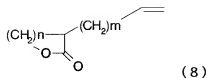
selected from 1, 2, and 4, m represents an integer selected from 0-1 to 8, when n = 3, m represents an integer ~~selected from 0 and~~ 2 to 8, and when the polyhydroxyalkanoate includes more than one unit of the chemical formula (6)~~multiple units exist~~, m and n are independently selected for each unit.

5. (Currently Amended) A polyhydroxyalkanoate according to any one of claims 1 to 4, further comprising a unit represented by chemical formula (7) in a molecule:

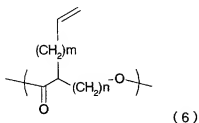


wherein R<sub>7</sub> represents a linear or branched alkylene group having 1 to 11 carbon atoms, an alkyleneoxyalkylene group each alkylene of which has 1 or 2 carbon atoms (alkylene groups each independently have 1 or 2 carbon atoms), or an alkylidene group having 1 to 5 carbon atoms, which may be substituted by an aryl group, and when the polyhydroxyalkanoate includes more than one unit of the chemical formula (7)~~multiple units exist~~, R<sub>7</sub> is independently for each unit.

6. (Currently Amended) A method of producing a polyhydroxyalkanoate represented by chemical formula (6) comprising a step of polymerizing a compound represented by chemical formula (8) in a presence of a catalyst:

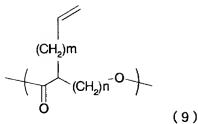


wherein n represents an integer selected from 1 to 4, when n represents an integer selected from 1, 2, and 4, m represents an integer selected from 0-1 to 8, and when n = 3, m represents an integer selected from 0-and-2 to 8,

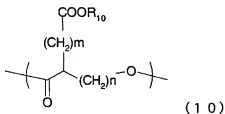


wherein n represents an integer selected from 1 to 4, when n represents an integer selected from 1, 2, and 4, m represents an integer selected from 0-1 to 8, when n = 3, m represents an integer selected from 0-and-2 to 8, and when the polyhydroxyalkanoate includes more than one unit of the chemical formula (6) multiple units exist, m and n are independently selected for each unit.

7. (Currently Amended) A method of producing a polyhydroxyalkanoate containing a unit represented by chemical formula (10) comprising a step of oxidizing a double bond portion of a polyhydroxyalkanoate containing a unit represented by chemical formula (9):



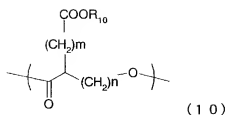
wherein n represents an integer selected from 1 to 4 and m represents an integer selected from 0-1 to 8, and when the oxidized polyhydroxyalkanoate includes more than one unit of the chemical formula (9) multiple units exist, m and n are independently selected for each unit,



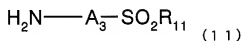
wherein R<sub>10</sub> represents a hydrogen atom or a group for forming a salt, n represents an integer selected from 1 to 4, m represents an integer selected from 0-1 to 8, and when the produced polyhydroxyalkanoate includes more than one unit of the chemical formula (10) multiple units exist, m, n, and R<sub>10</sub> are independently selected for each unit.

8. (Currently Amended) A method of producing a polyhydroxyalkanoate containing a unit represented by chemical formula (1) comprising a step of subjecting a polyhydroxyalkanoate containing a unit represented by chemical formula (10) and at least one amine compound represented by chemical formula (11) to a condensation reaction:

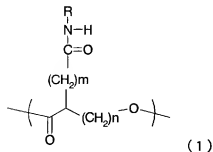




wherein  $R_{10}$  represents hydrogen or a group for forming a salt,  $n$  represents an integer selected from 1 to 4,  $m$  represents an integer selected from 0-1 to 8, and when the polyhydroxyalkanoate subjected to the condensation reaction includes more than one unit of the chemical formula (10) multiple units exist,  $m$ ,  $n$ , and  $R_{10}$  are independently selected for each unit:



wherein  $R_{11}$  represents OH, a halogen atom, ONa, OK, or  $\text{OR}_{11a}$ ,  $R_{11a}$  and  $A_3$  are each independently selected from groups each having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure, and when more than one compound of the chemical formula (11) is used in the condensation reaction multiple units exist,  $R_{11}$ ,  $R_{11a}$ , and  $A_3$  are independently selected for each unit compound of the chemical formula (11).

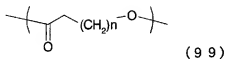


wherein R represents  $-A_1-SO_2R_1$ ,  $R_1$  represents OH, a halogen atom, ONa, OK, or  $OR_{1a}$ ,  $R_{1a}$  and  $A_1$  each independently represent a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure, n represents an integer selected from 1 to 4, m represents an integer selected from 0-1 to 8, and when the produced polyhydroxyalkanoate includes more than one unit of the chemical formula (1)~~multiple units exist~~, R,  $R_1$ ,  $R_{1a}$ ,  $A_1$ , m, and n are independently selected for each unit.

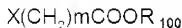
9. (Currently Amended) A method of producing a polyhydroxyalkanoate containing a unit represented by chemical formula (101) comprising the steps of:

allowing a polyhydroxyalkanoate containing a unit represented by chemical formula (99) to react with a base; and

allowing a compound obtained in the foregoing step to react with a compound represented by chemical formula (100):

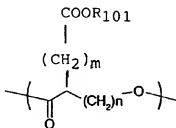


wherein n represents an integer selected from 1 to 4, and when ~~multiple units exist~~the polyhydroxyalkanoate allowed to react with the base includes more than one unit of the chemical formula (99), n is independently selected for each unit,



( 1 0 0 )

wherein m represents an integer selected from 0-1 to 8, X represents a halogen atom, and  $R_{100}$  represents a linear or branched alkyl or aralkyl group having 1 to 12 carbon atoms, and when  $n = 4$  in the chemical formula (99), m is not equal to 0,

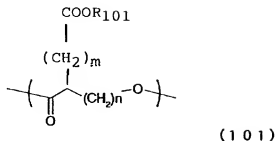


( 1 0 1 )

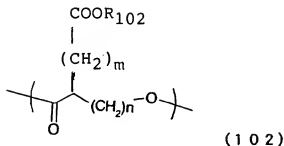
wherein n represents an integer selected from 1 to 4, when n represents an integer selected from 1 to 3, ~~m represents an integer selected from 0 to 8, when n = 4,~~ m represents an integer selected from 1 to 8,  $R_{101}$  represents a linear or branched alkyl or aralkyl group having 1 to 12 carbon atoms, and when multiple units exist, the produced polyhydroxyalkanoate includes more than one unit of the chemical formula (101).  $R_{101}$ , m, and n are independently selected for each unit.

10. (Currently Amended) A method of producing a polyhydroxyalkanoate containing a unit represented by chemical formula (102) comprising a step of hydrolyzing a polyhydroxyalkanoate containing a unit represented by chemical formula (101) in a presence of an acid or an alkali or a step of subjecting the polyhydroxyalkanoate to hydrogenolysis including

a catalytic reduction:



wherein n represents an integer selected from 1 to 4, when n represents an integer selected from 1 to 3, ~~m represents an integer selected from 0 to 8, when n = 4,~~ m represents an integer selected from 1 to 8, R<sub>101</sub> represents a linear or branched alkyl or aralkyl group having 1 to 12 carbon atoms, and when multiple units exist the polyhydroxyalkanoate that is hydrolyzed or subjected to hydrogenolysis includes more than one unit of the chemical formula (101), R<sub>101</sub>, m, and n are independently selected for each unit,

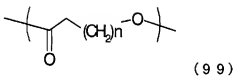


wherein R<sub>102</sub> represents hydrogen or a group for forming a salt, n represents an integer selected from 1 to 4, when n represents an integer selected from 1 to 3, ~~m represents an integer selected from 0 to 8, when n = 4,~~ m represents an integer selected from 1 to 8, and when multiple units exist the produced polyhydroxyalkanoate includes more the one unit of the chemical formula (102), R<sub>102</sub>, m, and n are independently selected for each unit.

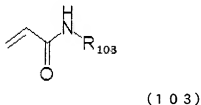
11. (Currently Amended) A method of producing a polyhydroxyalkanoate containing a unit represented by chemical formula (104) comprising the steps of:

allowing a polyhydroxyalkanoate containing a unit represented by chemical formula (99) to react with a base; and

allowing a compound obtained in the foregoing step to react with a compound represented by chemical formula (103):

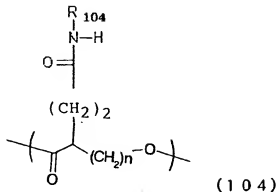


wherein n represents an integer selected from 1 to 4, and when ~~multiple units exist~~ the polyhydroxyalkanoate allowed to react with the base includes more than one unit of the chemical formula (99), n is independently selected for each unit,



wherein R<sub>103</sub> represents -A<sub>103</sub>-SO<sub>2</sub>R<sub>103a</sub>, R<sub>103a</sub> represents OH, a halogen atom, ONa, OK, or OR<sub>103b</sub>, R<sub>103b</sub> and A<sub>103</sub> are each independently selected from groups each having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure, and when ~~multiple units exist~~ more than one compound of the chemical formula (103) is allowed to react,

$R_{103}$ ,  $R_{103a}$ ,  $R_{103b}$ , and  $A_{103}$  are independently selected for each compound of the chemical formula (103) unit,



wherein  $n$  represents an integer selected from 1 to 4,  $R_{104}$  represents  $-A_{104}-SO_2R_{104a}$ ,  $R_{104a}$  represents OH, a halogen atom, ONa, OK, or  $OR_{104b}$ ,  $R_{104b}$  and  $A_{104}$  each independently represent a group having a substituted or unsubstituted aliphatic hydrocarbon structure, a substituted or unsubstituted aromatic ring structure, or a substituted or unsubstituted heterocyclic structure, and when ~~multiple units exist~~ the produced polyhydroxyalkanoate includes more than one unit of the chemical formula (104),  $R_{104}$ ,  $R_{104a}$ ,  $R_{104b}$ ,  $A_{104}$ , and  $n$  are independently selected for each unit.